Revisiting the Intellectual Capital–Performance Nexus: Evidence on the Moderating Influence of Competitive Advantage

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ABSTRACT

This study investigates the influence of intellectual capital components—namely human capital, structural capital, and physical capital—on the financial performance of banking institutions, with a specific focus on the moderating effect of competitive advantage. The research draws on a sample of banking firms listed on the Indonesia Stock Exchange and the Commercial Bank of Malaysia for the period 2020 to 2023. A total of 264 firm-year observations were obtained through purposive sampling based on established selection criteria. Panel data regression analysis, conducted using Stata software, reveals that both human capital and physical capital exert a positive and statistically significant effect on return on assets (ROA). In contrast, structural capital and competitive advantage exhibit no direct significant relationship with ROA. However, competitive advantage is found to significantly moderate the relationship between physical capital and financial performance, suggesting its role in amplifying the value derived from tangible assets.

Keywords: Intellectual Capital Components; Competitive Advantage; Financial Performance.

Pengaruh Moderasi Keunggulan Bersaing terhadap Hubungan antara Modal Intelektual dan Kinerja Keuangan

ABSTRACT

Penelitian ini bertujuan untuk menguji pengaruh komponen intellectual capital: human capital, structural capital, dan physical capital terhadap financial performance, dengan competitive advantage sebagai moderasi. Populasi penelitian ini adalah perusahaan sektor perbankan yang tercatat di Bursa Efek Indonesia dan Bank Komersial Malaysia selama periode 2020-2023. Sebanyak 264 data amatan memenuhi kriteria yang dipilih dengan purposive sampling. Hasil penelitian regresi data panel dengan software Stata menunjukkan bahwa, human capital dan physicasl capital berpengaruh positif dan signifikan terhadap ROA, sedangkan structural capital dan competitive advantage tidak berpengaruh signifikan. Competitive advantage terbukti memoderasi secara signifikan hubungan antara physical capital dan ROA.

Kata Kunci: *Intellectual Capital Components; Competitive Advantage; Financial Performance.*

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INTRODUCTION

Business expansion remains a fundamental pillar of modern economies and serves as a key indicator of societal prosperity. Within this context, globalization has played a critical role in facilitating the pursuit of competitive advantage, enabling organizations to achieve sustainable growth across diverse regions (Perło & Arszułowicz, 2022). Organizational performance and long-term sustainability are contingent upon the strategic alignment of objectives and the efficient allocation of resources (Bucur, 2023). Drawing on the resource-based view (RBV) theory, intellectual capital is positioned as a vital asset for securing competitive advantage in knowledge-driven economies through the strategic utilization and development of organizational resources (Rachmah et al., 2023).

The IMD World Competitiveness Center contributes significantly to understanding national competitiveness by publishing annual rankings that assess economic performance, government efficiency, business efficiency, and infrastructure. These assessments offer strategic insights for policymakers, practitioners, and researchers, and include evaluations of economies such as Indonesia and Malaysia (IMD, 2024). Empirical evidence by Awwad & Qtaishat (2023) supports the positive relationship between enhanced competitiveness and the effective deployment of intangible assets, notably intellectual capital, in strengthening the strategic positioning of firms—particularly within the banking sector. The 2024 IMD report ranks Asian countries by competitiveness, with particular implications for interpreting intellectual capital dynamics in the context of regional banking performance. This is illustrated in the following figure.

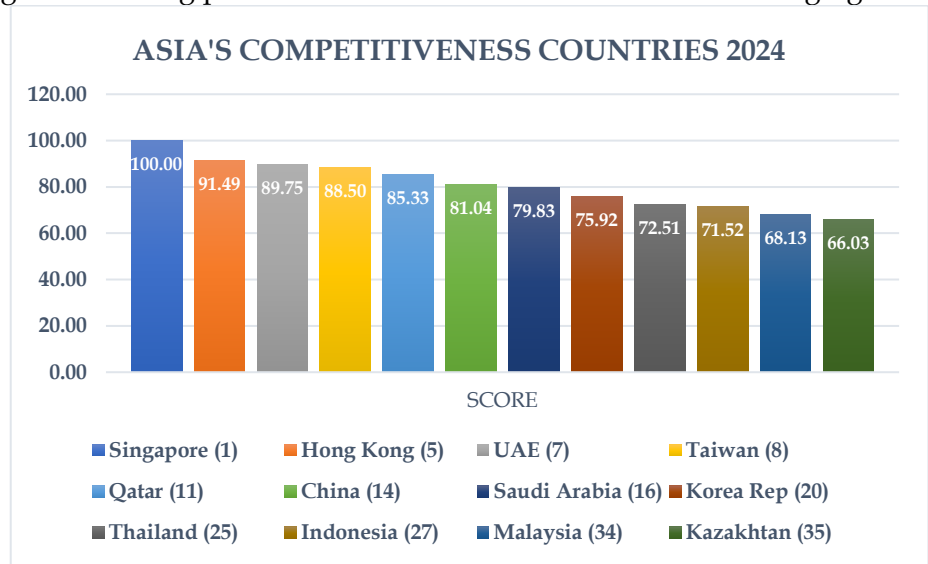

Figure 1. Research Phenomenom

Source: International Institute for Management Development (IMD), 2024

The IMD World Competitiveness Ranking 2024 highlights a significant disparity in competitiveness across Southeast Asia. Singapore retained its leading position (score: 100.00), while Indonesia ranked 27th (score: 71.52) and Malaysia 34th (score: 68.13), despite ongoing reforms and strategic initiatives. Indonesia's improvements were largely driven by accelerated digital transformation,

infrastructure development, and regulatory enhancements (BKPM, 2024). In contrast, Malaysia's growth strategies focused on green economy initiatives and financial innovation (The Edge Malaysia, 2024). Nonetheless, both countries' relatively lower rankings underscore the urgent need to enhance financial performance, particularly in strategic sectors such as banking, which serves as a cornerstone of national economic development (Hayuningtyas et al., 2024). B. C. Pratama et al. (2023) argues that the economy can advance quickly when banks are able to efficiently mobilize savings, draw in investment, disburse funding, invest, and create jobs.

To drive improvements in financial performance, prior studies emphasize the importance of intellectual capital and competitive advantage, which significantly contribute to profitability and long-term sustainability (Kamukama et al., 2017; Xu & Li, 2022). Strengthening intellectual capital and cultivating competitive advantage are thus critical strategies for enhancing banking sector efficiency and profitability, particularly in emerging markets like Indonesia and Malaysia, to elevate their global competitiveness. Several studies have examined the influence of intellectual capital (Asare et al., 2020; Cenciarelli et al., 2018; García Castro et al., 2021; Habibah & Riharjo, 2016; Majumder et al., 2023; Nadeem et al., 2017; B. Pratama et al. 2022; Ul Rehman et al., 2023; Wahyuni et al. 2023; Xu & Liu, 2021) and competitive advantage (Kamukama et al., 2017; A. Pratama et al., 2024) on firm performance, offering valuable insights into this nexus.

Intellectual capital, comprising human, structural, and physical capital, is regarded as an intangible asset that facilitates value creation, high performance, and the attainment of organizational objectives (AlQershi et al., 2023). B. C. Pratama et al. (2022) argues that in the knowledge-based economy, intellectual capital may be described as the primary driving factor for value production. In the context of banking, institutions operate in increasingly dynamic economic and technological environments, and thus rely on intellectual capital to bridge institutional gaps, improve financial outcomes, and build competitive advantage (Ul Rehman et al., 2023). Effective intellectual capital management enhances a bank's financial resilience and adaptability to market changes (Rochmadhona et al., 2018). Empirical findings by Nadeem et al. (2017); Ur Rehman et al. (2022); and Xu & Liu (2021) affirm the strategic value of intellectual capital in improving financial performance and securing long-term advantage. However, contrary evidence from Dalwai et al. (2022) and Weqar et al. (2021) suggests that intellectual capital does not always significantly drive financial outcomes—highlighting a research gap that warrants further investigation.

The second key variable is competitive advantage, which plays a pivotal moderating role in evaluating national and firm-level competitiveness. Pratama et al. (2024) contend that competitive advantage enables firms to achieve strategic superiority. Malaysia, for example, enjoys a relative advantage in banking product diversification and stable financial policy frameworks, while Indonesia benefits from a larger market size but faces persistent challenges in operational efficiency and digital adoption (IMF, 2024; OJK, 2024). Hapsari (2018) argues that competitive advantage is essential for distinguishing one bank from another in a saturated market. Relative to advanced financial centers like Singapore and Hong Kong, Indonesia and Malaysia remain in the developmental phase of competitive

positioning. Porter (1985) defines competitive advantage as the central driver of firm performance, derived from strategic initiatives that yield superior economic returns. Prior research by Kamukama et al. (2011) identifies competitive advantage as a key mediating mechanism that enhances the effect of intellectual capital on financial performance—boosting outcomes by up to 22.4% in financial institutions.

This study builds upon prior research by Ul Rehman et al. (2023), which examined the relationship between intellectual capital and financial performance in banks across ASEAN's largest economies from 2017 to 2021. In contrast, the current study focuses specifically on commercial banks listed on the Indonesia Stock Exchange and the Commercial Bank of Malaysia from 2020 to 2023. The financial sector was selected due to its pivotal role in fostering economic competitiveness. By incorporating the latest data from the 2024 Asia Competitiveness Rankings, this study aims to provide a more nuanced understanding of the link between intellectual capital and financial performance, with competitive advantage introduced as a moderating variable. This expanded framework enables a deeper exploration of how competitive advantage amplifies the interaction between intellectual capital and financial outcomes, thereby supporting sustainable improvements in national competitiveness amid accelerating globalization.

The resource-based view (RBV), developed by Wernerfelt (1984) and further refined by Barney (1991), posits that a firm's financial performance can be enhanced through the strategic management of internal resources that are valuable, rare, inimitable, and non-substitutable. Within this framework, intellectual capital—particularly human capital—is identified as a strategic asset that underpins organizational capabilities, enhances operational efficiency, and contributes to sustainable financial outcomes (Hafidhah et al., 2022; Panno, 2020). Human capital, as the core component of intellectual capital, reflects the collective knowledge, skills, experience, and competencies of employees, which play a crucial role in improving productivity and profitability, especially in the banking sector (Nadeem et al., 2017).

A well-executed resource-based strategy that leverages human capital is difficult for competitors to replicate, thereby amplifying its positive impact on financial performance (Makadok, 2001). High-quality human resources are essential in promoting innovation and informed decision-making, contributing significantly to improved performance outcomes (Majumder et al., 2023). In dynamic financial markets such as Indonesia and Malaysia, the banking sector heavily relies on human capital to navigate regulatory shifts and market competition. Hafidhah et al. (2022) and Winarni & Zamakhsyari (2021) emphasize the importance of investing in human capital supported by training and technology such us software will greatly assist employee performance in improving the quality of accounting information to ensure long-term financial sustainability. Accordingly, this study hypothesizes:

H_1: Human capital has a significant positive effect on financial performance.

In addition to human capital, structural capital plays a critical role in shaping financial outcomes. Under RBV theory, structural capital—comprising organizational systems, processes, databases, and intellectual property—supports value creation and efficiency (Barney, 1991). In banking, structural capital

enhances internal operations and risk management capabilities, which in turn influence profitability (Soetanto & Liem, 2019). ASEAN banks, including those in Indonesia and Malaysia, increasingly recognize the strategic role of structural capital in driving financial performance (Ul Rehman et al., 2023).

Empirical studies have established a positive association between structural capital and firm performance. Ali et al. (2021) found that investing in organizational infrastructure significantly boosts operational efficiency and profitability. Similarly, Acuña-Opazo & González (2021) and Ur Rehman et al. (2022) highlight the critical role of structural capital in optimizing value creation processes. Thus, the second hypothesis is proposed:

H_2: Structural capital has a significant positive effect on financial performance.

Physical capital, as a tangible asset, also holds strategic relevance under RBV theory. In banking, physical capital includes physical infrastructure such as branch networks, IT systems, and equipment, all of which contribute to service delivery and operational efficiency (Ul Rehman et al., 2023). Effective deployment of physical capital enhances capital productivity, a key element of the Value Added Intellectual Coefficient (VAIC) framework (Pulic, 2004). Sharabati et al. (2010) argue that banks with strategically managed physical capital—particularly modern infrastructure and well-located branches—can generate higher revenues and deliver better financial returns.

Recent studies affirm the positive impact of physical capital on performance outcomes. Asutay & Ubaidillah (2024), Dalwai et al. (2022), and Xu et al. (2023) find that banks that invest wisely in physical infrastructure tend to achieve superior financial outcomes. This leads to the third hypothesis:

H_3: Physical capital has a significant positive effect on financial performance.

Competitive advantage, while often examined as an outcome, is also a critical determinant of performance under RBV theory. A firm's ability to deploy its intangible assets—particularly intellectual capital—towards the creation of unique and inimitable value propositions can enhance financial performance (Ul Rehman et al., 2023). In banking, competitive advantage is manifested in product innovation, customer relationship management, and adaptability to market shifts (Asutay & Ubaidillah, 2024; Le et al., 2022; Xu & Liu, 2021). Banks that can translate internal capabilities into superior customer value tend to realize better profitability and market share.

Research supports this perspective. Ahamad et al. (2023), Dalwai et al., (2022) and Xu et al. (2023) demonstrate that competitive advantage significantly contributes to financial outcomes by enabling banks to attract and retain customers, innovate, and manage risks effectively. Therefore, this study proposes:

H_4: Competitive advantage has a significant positive effect on financial performance.

In addition to its direct influence, competitive advantage may also play a moderating role in the relationship between intellectual capital components and financial performance. Human capital efficiency—the extent to which knowledge, skills, and capabilities are transformed into organizational value—may be more impactful when mediated by a strong competitive advantage (Ul Rehman et al., 2023). Ahamad et al. (2023) and Dalwai et al. (2022) argue that external factors such as competitive advantage enhance the translation of human capital into financial

performance. When banks are competitively positioned, they are more likely to deploy their human capital effectively, leading to innovation, efficiency, and profitability (Asutay & Ubaidillah, 2024; Xu et al., 2023).

Competitive advantage acts as a catalyst that enables human capital to operate at optimal levels, especially in volatile financial environments like those in Indonesia and Malaysia (Nadeem et al., 2017). This dynamic is consistent with Xu & Liu (2021), who emphasize the strategic alignment of resources through competitive positioning. Thus, the next hypothesis is formulated as:

H_5: Competitive advantage moderates the positive relationship between human capital and financial performance.

Similarly, structural capital's impact on financial outcomes may be amplified when aligned with a firm's competitive advantage. Structural capital reflects an organization's ability to leverage systems and processes that support innovation and adaptability (Ul Rehman et al., 2023). According to Teece et al. (1999), competitive advantage functions as a dynamic capability that enables organizations to continually align internal infrastructure with market demands. This alignment enhances productivity, adaptability, and profitability.

Ousama et al. (2020) also note that competitive advantage strengthens the utility of structural capital by fostering innovation and knowledge management. Hence, the sixth hypothesis is proposed:

H_6: Competitive advantage moderates the positive relationship between structural capital and financial performance.

Lastly, the influence of physical capital on financial performance is also contingent on the strategic use of competitive advantage. While physical capital is essential for operational efficiency, its contribution to financial performance depends on how effectively it is leveraged within a competitive framework (Ul Rehman et al., 2023). Banks with strong competitive positioning can more effectively deploy their physical capital resources to respond to market demands and enhance customer experience (Asutay & Ubaidillah, 2024). Teece et al. (1999) and Sirmon et al. (2011) further highlight the role of dynamic capabilities in facilitating the integration and reconfiguration of physical capital to sustain competitive advantage.

Accordingly, this study proposes the final hypothesis:

H_7: Competitive advantage moderates the positive relationship between physical capital and financial performance.

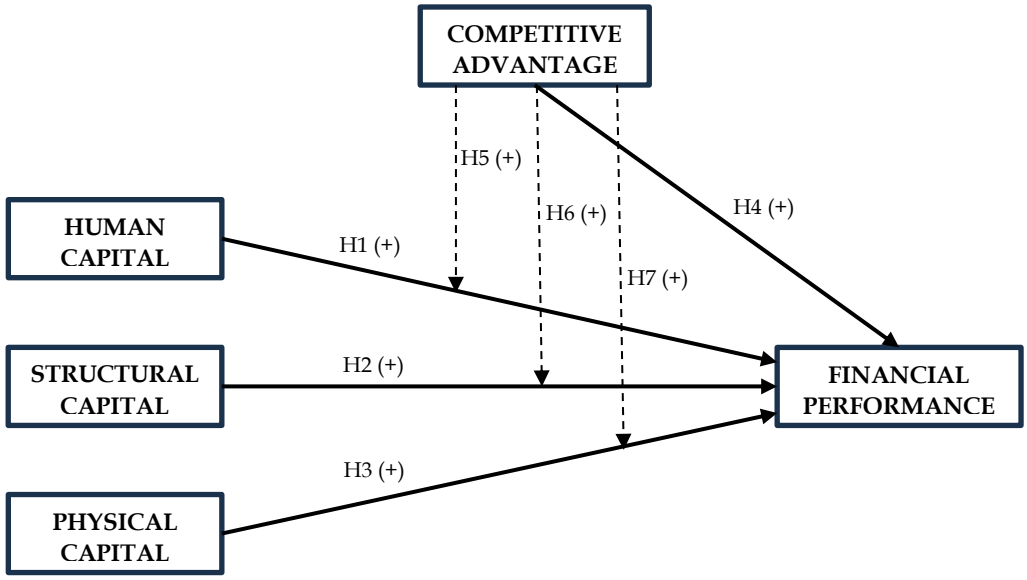

Figure 2. Research Model

Source: Research Data, 2025

RESEARCH METHODS

Table 1. Research Criteria

Research Criteria
• Indonesian banking sector companies listed on the IDX and Malaysian banking sector companies listed on the Commercial Bank of Bank Negara Malaysia (BNM) during the period 2020–2023.
• Reporting financial statements or annual reports for the period 2020–2023.

Source: Research Data, 2025

The secondary data for this study were sourced from financial statements and annual reports of banking companies listed on the Indonesia Stock Exchange and Malaysian commercial banks. These documents were obtained from official company websites and stock exchange portals covering the period from 2020 to 2023. The sample was selected using a purposive sampling technique, which, according to Nyimbili & Nyimbili (2024), is widely applied across research paradigms due to its effectiveness in identifying high-quality, unbiased samples. This method enhances the credibility and reliability of research findings by ensuring the selection of cases that meet predefined criteria. Based on these criteria, as summarized in Table 1, the final sample comprised 66 companies, yielding 264 firm-year observations from the banking sector in Indonesia and Malaysia that had publicly disclosed financial and/or annual reports during the observation period.

Tabel 2. Operational Definition

Variables	Operational Definition of Variables	Variable Measurement
Financial Performance (Y)	Financial Performance describes the state of the firm's finances over a specific time period and the outcome of management's use of corporate resources, profitability and efficiency indicators are frequently used to evaluate Financial Performance. (Rusmawan et al., 2023)	$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$ X 100% (Xu et al., 2023)
Intellectual Capital (X)	Intellectual Capital is an intangible asset that is used to create value, achieve high performance, and realize the goals of the company. (AlQershi et al., 2023)	VAIC = HCE + SCE + CEE (Pulic, 2004)
Human Capital (X1)	Human Capital is measured using Human Capital Efficiency (HCE) which means the ratio between the company's Value Added (VA) to the cost of human capital, such as salaries, training, and benefits (Ousama et al., 2020)	$\text{HCE} = \frac{\text{VA}}{\text{HC}}$ (Pulic, 2004)
Structural Capital (X2)	Structural Capital is measured using the Structural Capital Efficiency (SCE) proxy which is used to measure how effective a company, especially bank, leveraging organizational systems, information technology, and internal processes to support value creation. (Ur Rehman et al., 2022)	$\text{SCE} = \frac{\text{SC}}{\text{VA}}$ (Pulic, 2004)
Physical Capital (X3)	Physical Capital proxied by Capital Employed Efficiency (CEE) measures the efficiency of physical and financial capital utilization in creating added value. (Ul Rehman et al., 2023)	$\text{CEE} = \frac{\text{VA}}{\text{CE}}$ (Pulic, 2004)
Competitive Advantage (Z)	Competitive Advantage measured using Asset Utilization Capability (AUC), which is the company's effectiveness in utilizing assets to compete and generate profits. (Hapsari, 2018)	$\text{AUC} = \frac{\text{Total Revenue}}{\text{Total Assets}}$ X 100% (Hapsari, 2018) dan (Smith & Meso, 2000)

Source: Research Data, 2025

A panel data regression model is utilized in this study to investigate the effect of independent and moderating variables on dependent variables. Furthermore, the Hausman Test is used to select the optimal model between Random Effect (RE) and Fixed Effect (FE) (Gujarati & Porter (2009).

This study uses Model (1) to test the effect of HCE, SCE, and CEE on ROA. While Model (2) is used to test the moderating effect of AUC on the relationship between HCE, SCE, CEE on ROA. The following is the regression equation

model used in this study:

(1) ROA = a + β1HCE + β2SCE + β3CEE + β4AUC + β5SIZE+ β6Lev+ e

(2) ROA = a + β1HCE + β2SCE + β3CEE + β4AUC + β5HCE*AUC + β6SCE*AUC + β7CEE*AUC + β8Lev + β9SIZE + e

Where:

ROA	= Return on Asset
a	= Constant
β1 – β9	= Regression coefficient in each variable
HCE	= Human Capital Efficiency
SCE	= Structural Capital Efficiency
CEE	= Capital Employed Efficiency
Lev	= Leverage
SIZE	= Company Size
AUC	= Asset Utilization Capability
e	= Error term

RESULT AND DISCUSSION

This analysis is used to describe the data collected with the aim of providing an overview of the main value distribution and potential heterogeneity between companies in the research sample.

Table 3. Descriptive Stastistical Analysis Test Result

Variable	Mean	Std. Deviation	Minimum	Maximum
ROA	0.007	0.022	-0.180	0.840
HCE	2.512	2.674	-10.606	19.099
SCE	0.534	1.608	-17.214	16.040
CEE	0.194	0.188	-1.087	1.197
AUC	0.065	0.057	0.000	60.554
SIZE	29.562	3.223	23.021	35.315
Lev	5.827	3.741	-1.000	20.092
Observation	264			

Source: Research Data, 2025

The descriptive statistics for the panel data comprising 264 observations from banking firms during the 2020–2023 period reveal an average profitability (ROA) of 0.007, or 0.70%. This figure suggests relatively weak financial performance across the sample, falling below the benchmark of 1.5% commonly used to indicate sound banking health, as stipulated in Bank Indonesia Regulation No. 13/1/PBI/2011. Such a low level of profitability may signal potential concerns regarding operational efficiency or financial stability within the sampled banks.

In evaluating intellectual capital performance, the study adopts the classification framework proposed by Kamath (2007), which categorizes Value Added Intellectual Coefficient (VAIC) scores into four tiers: top performers (>5), good performers (4–5), common performers (2.5–4), and poor performers (<2.5). The average VAIC score for the sampled firms is 3.241, positioning the majority of Indonesian and Malaysian banking institutions within the 'common' to 'good' performer range. This result indicates that, overall, the sector demonstrates a

moderate level of effectiveness in managing and leveraging intellectual capital resources to create value.

Following the descriptive analysis, the Hausman specification test is employed to determine the appropriate econometric model for hypothesis testing, specifically whether the Fixed Effects Model or the Random Effects Model provides a more consistent and efficient estimator for the panel data structure.

Table 4. Hausman Test

Hausman Test	Chi2	Prob > Chi2	Result
Model 1	73.90	0.000	FE
Model 2	89.55	0.000	FE

Source: Research Data, 2025

Wooldridge (2002) emphasizes that the Hausman test is a fundamental diagnostic tool for determining the appropriate estimation technique in panel data analysis, specifically by comparing the consistency of fixed effects (FE) and random effects (RE) estimators. As shown in Table 4, the Hausman test results for Models 1 and 2 indicate that the fixed-effects model is preferable. This is evidenced by a chi-square probability value (Prob > Chi2) of 0.000, which is below the conventional 5% significance threshold. Thus, the null hypothesis—stating that the RE estimator is consistent—is rejected, confirming that the fixed-effects model provides a more reliable estimation for the data structure in this study.

Subsequently, a series of classical assumption tests were conducted to validate the robustness of the regression results. These included assessments of normality, homoscedasticity (constant variance), and the absence of autocorrelation in the error terms. These diagnostic tests are consistent with standard econometric procedures as outlined by Gujarati & Porter (2009) and King et al. (2017), ensuring that the model adheres to the fundamental assumptions required for linear regression analysis.

Table 5. Heteroscedasticity Test and Serial Correlation Test

Model 1		**Model 2**	
Full Sample	264	Full Sample	264
Heteroscedasticity		Heteroscedasticity	
Chi2	36,507.87	Chi2	16,427.72
Prob > Chi2	0.000	Prob > Chi2	0.000
Serial Correlation		Serial Correlation	
F	13.096	F	19.218
Prob > F	0.000	Prob > F	0.000

Source: Research Data, 2025

Table 5 presents the results of the heteroscedasticity and serial correlation tests for both Model 1 and Model 2. The presence of heteroscedasticity is confirmed by the chi-squared probability value (Prob > Chi2), which is 0.000 for both models—well below the 0.05 significance threshold. This indicates a violation of the homoscedasticity assumption, suggesting that the variance of the error terms is not constant across observations.

In addition, the results reveal significant serial correlation. This is evidenced by the probability value (Prob > F) for both models, also recorded at 0.000, which falls below the 5% significance level. These findings suggest that the residuals are not independent across time, thereby violating the assumption of no autocorrelation. Consequently, these issues must be addressed to ensure the validity of the regression estimates.

Table 6. Hypothesis Test Model 1

The results of the hypothesis tests of Model 1 are shown in Table 6 and the regression model equation obtained in this study is shown below:

Hypothesis	Path	Coefficient	T value	P>|t|	Result
H1	HC → FP	0.004	2.25	0.028**	Accepted
H2	SC → FP	-0.000	-0.21	0.831	Rejected
H3	PC → FP	0.080	3.75	0.000***	Accepted
H4	CA → FP	0.061	1.10	0.274	Rejected
R-Squared		0.689			
F		18.26			
Prob>F		0.000			
*10% Sign					
**5% Sign					
***1% Sign					

Source: Research Data, 2025

Table 7. Hypothesis Test Model 2

The results of the hypothesis tests of Model 2 are shown in Table 7 and the regression model equation obtained in this study is shown below:

Hypothesis	Path	Coefficient	T value	P>|t|	Result
H5	HC*CA→ FP	-0.011	-2.02	0.047**	Rejected
H6	SC*CA→ FP	0.022	0.71	0.481	Rejected
H7	PC*CA→ FP	1.288	3.01	0.004***	Accepted
R-Squared		0.739			
F		96.27			
Prob>F		0.000			
*10% Sign					
**5% Sign					
***1% Sign					

Source: Research Data, 2025

The coefficient of determination (R^2) in Model 1 is 0.689, indicating that 68.9% of the variation in financial performance is explained by human capital, structural capital, physical capital, and competitive advantage, while the remaining 31.1% is attributable to factors outside the model. The F-statistic of 18.26 with a p-value (Prob > F) of 0.000 confirms that the model is statistically significant at the 1% level. Accordingly, the null hypothesis (H_0) is rejected, suggesting that the independent variables jointly exert a significant influence on financial performance.

To account for potential issues of autocorrelation and heteroscedasticity, the model employs fixed effects regression with cluster-robust standard errors. Robustness was further tested using the Driscoll-Kraay standard error approach. The consistency of the findings across both methods affirms the validity of the regression results.

The test of Hypothesis 1 (H1) reveals a significant positive association between human capital—used as a proxy for intellectual capital efficiency—and financial performance, as measured by return on assets (ROA). This finding supports the argument that Indonesian and Malaysian banking institutions are effectively utilizing human capital to enhance organizational performance. As shown in Table 3, the average VAIC score of 3.241 classifies these firms as "common performers" approaching the "good performer" category, according to the classification by Kamath (2007). This outcome affirms the assertion that human capital, as a core component of intellectual capital, contributes meaningfully to financial performance.

These results are consistent with Resource-Based View (RBV) theory, which posits that the strategic use of valuable, rare, and non-substitutable resources—such as human capital—can generate sustainable competitive advantage and improved financial outcomes (Barney, 1991). Empirical support is found in the studies of Le et al. (2022), Xu et al. (2023), and Ur Rehman et al. (2022), all of which conclude that investment in human capital positively influences the financial performance of banks, particularly in Southeast Asia. Accordingly, H1 is accepted.

The test of Hypothesis 2 (H2) does not yield evidence of a statistically significant relationship between structural capital and financial performance. Although the average VAIC score remains at 3.241—indicating moderate efficiency in intellectual capital utilization—the regression results do not support the hypothesis. The p-value exceeds the 5% threshold, and the t-statistic is negative (-0.21), suggesting that structural capital does not have a significant impact on ROA for the banking sectors in Indonesia and Malaysia.

These findings align with the work of Ahamad et al, (2022) and Dalwai et al, (2022), who argue that structural capital has a limited role in enhancing financial outcomes within ASEAN banking contexts. This could reflect inefficiencies in how organizational systems, internal processes, and supporting infrastructure are being managed. Ur Rehman et al. (2022) emphasize that the failure to optimize decision-making systems and data processing capabilities may reduce the strategic value of structural capital. Similarly, Cheng et al, (2022) and Mohammad et al, (2019) argue that the effectiveness of structural capital is context-dependent and influenced by a firm's objectives, technological maturity, and innovation orientation. B. Pratama et al. (2020) also explained that assets must have VRIO qualities in order to improve performance, perhaps structural capital did not meet the VRIO characteristics, so it did not improve performance. Therefore, H2 is rejected.

The results for Hypothesis 3 (H3) indicate a significant and positive impact of physical capital—measured through capital employed efficiency (CEE)—on financial performance. This supports the contention that banking institutions in Indonesia and Malaysia are leveraging physical capital effectively to enhance profitability. The descriptive statistics in Table 3 again reveal an average VAIC score of 3.241, consistent with a moderate to high level of intellectual capital utilization. Within this framework, physical capital emerges as a critical driver of financial performance.

Ur Rehman et al. (2022) emphasize that while tangible assets alone do not guarantee improved outcomes, efficient deployment of physical capital—such as branch networks and IT infrastructure—can lead to greater operational efficiency and profitability, particularly in technology-intensive industries like banking. This finding is consistent with the RBV framework, where efficient capital utilization enhances firm competitiveness (Asutay & Ubaidillah, 2024). Le et al. (2022) similarly conclude that well-managed physical capital significantly improves bank performance in developing economies. In the Indonesian context, Harto et al. (2020) report a positive relationship between CEE and ROA, further corroborated by Xu et al. (2023), who argue that the impact of physical capital varies depending on firm size and national economic conditions. Hence, H3 is accepted.

The results of Hypothesis 4 (H4) reveal that competitive advantage, as measured by AUC, does not have a significant impact on the financial performance of banks in Indonesia and Malaysia. The statistical evidence does not support the assertion that improvements in competitive advantage correspond with enhanced financial outcomes in the banking sector. Although competitive advantage is widely considered a critical determinant of business success, its relationship with financial performance appears to be more nuanced and context-dependent.

Supporting this, Kaur & Kumar (2024) argue that within the financial sector, the application of RBV theory is more strongly associated with fostering innovation and competitive positioning rather than directly enhancing profitability. Similarly, Saroso & Ridwan (2020) highlight that the strict regulatory environment and intense market competition in banking can dilute the influence of internal resources on profit margins. Nikmah et al. (2021) further suggest that while competitive advantage contributes to long-term strategic positioning, its direct impact on short-term financial performance may be limited. Mixed findings are also reported by Ul Rehman et al. (2023), who observe inconsistencies in the link between intangible resources and financial outcomes. This reinforces the idea that other factors—such as operational efficiency, macroeconomic conditions, or institution-specific characteristics—may play a more significant role in shaping financial performance in Indonesia and Malaysia (Xu et al., 2023). Therefore, H4 is rejected.

The test of Hypothesis 5 (H5) explores the moderating effect of competitive advantage on the relationship between human capital efficiency (HCE) and financial performance. While a significant interaction was detected, the findings

suggest that competitive advantage does not enhance this relationship; rather, it may weaken the positive association between HCE and performance. Although human capital independently contributes to improved financial outcomes, its effect appears to be diminished when firms also exhibit high competitive advantage.

This observation aligns with the findings of Rochmadhona et al. (2018), who noted that the mediating role of competitive advantage in the ASEAN banking sector is not always robust. The current study indicates that in highly competitive banking environments, the need for constant adaptation to market and regulatory shifts may undermine the efficiency gains typically associated with human capital. Bawono et al. (2023) argue that while human capital is crucial, heightened competitive intensity can create additional pressures that reduce its effectiveness. Accordingly, H5 is rejected.

The results for Hypothesis 6 (H6) show no significant evidence that competitive advantage moderates the relationship between structural capital and financial performance in Indonesian and Malaysian banks. The p-value exceeds the 0.05 threshold, indicating insufficient support for the hypothesis. This suggests that competitive advantage does not amplify the influence of structural capital on financial performance in this context.

Nurseha et al. (2024) similarly argue that while structural capital and competitive advantage are integral to corporate strategy, their interaction does not consistently translate into improved financial outcomes. Rochmadhona et al. (2018) and Annisa & Slamet, (2023) also report limited moderating effects of competitive advantage in the relationship between structural capital and performance. Muchlis (2023) emphasizes that structural capital's effectiveness is contingent on how well internal resources are strategically utilized and aligned with firm objectives. Without such alignment, even robust structural capital and competitive positioning may fail to generate significant financial returns. Thus, H6 is rejected.

The test of Hypothesis 7 (H7) confirms a significant and positive moderating effect of competitive advantage on the relationship between physical capital efficiency (CEE) and financial performance. This indicates that banks with stronger competitive advantage are better positioned to utilize physical capital efficiently, thereby improving financial outcomes.

Under the RBV framework, competitive advantage enhances the strategic value of physical capital by enabling more effective resource deployment and operational control (Rabiu et al., 2025). Nguyen et al. (2023) emphasize that effective governance structures can strengthen the link between operational efficiency and financial performance. Similarly, Le & Nguyen (2020) demonstrate that banks with strong competitive positioning and efficient physical asset management achieve superior profitability and market performance. These findings reinforce the proposition that the synergy between physical capital and competitive advantage is a key determinant of financial success, particularly in

rapidly evolving and digitally driven banking environments. Therefore, H7 is accepted.

In summary, the results of this study yield several important theoretical and practical implications. From a theoretical perspective, the findings reinforce the RBV framework of Barney (1991) by confirming that human and physical capital are essential internal resources for driving sustainable financial performance, and that competitive advantage can enhance this effect—particularly in the case of physical capital. However, the limited or negative moderating influence of competitive advantage on human and structural capital underscores the complexity of resource interactions in competitive banking contexts.

From a practical standpoint, these results highlight the imperative for banks, especially in emerging economies such as Indonesia and Malaysia, to prioritize investment in human capital development and technological infrastructure to enhance operational efficiency. Moreover, the findings suggest that competitive advantage must be strategically aligned with internal capabilities to yield performance benefits. Policymakers and regulators are encouraged to support this alignment through policies that foster intellectual capital development, promote innovation, and encourage transparent and consistent reporting standards.

CONCLUSION

This study concludes that intellectual capital—particularly its human and physical capital components—plays a significant role in enhancing the financial performance of the banking sector. Aligned with the Resource-Based View (RBV) theory, which posits that a firm's internal resources and capabilities serve as the foundation for sustained competitive advantage (Barney, 1991), the findings confirm that intellectual capital remains a critical strategic asset. The results demonstrate that increased human capital contributes to higher productivity and profitability, while effective management of physical capital is associated with improved financial outcomes. Moreover, competitive advantage reinforces the positive relationship between physical capital and financial performance, underscoring its role in optimizing the utilization of corporate resources. These findings offer practical insights, particularly for banking institutions in Indonesia and Malaysia, by highlighting the strategic importance of targeted investment and sound intellectual capital management policies in achieving sustainable financial performance.

Despite its theoretical and practical contributions, this study is subject to several limitations. First, the exclusive use of a quantitative approach may not fully capture the nuanced, behavioral, and contextual aspects of intellectual capital management. Second, the study does not control for external macroeconomic variables—such as regulatory shifts, political instability, or global economic shocks—that may influence bank performance during the observation period. Third, the scope of analysis is confined to banking institutions in two Southeast

Asian countries over a limited timeframe, potentially restricting the generalizability of the findings across industries or geographies. To address these limitations, future research is encouraged to adopt mixed-method designs, incorporate both financial and non-financial performance indicators, and examine the influence of organizational culture, leadership, and strategic alignment in leveraging intellectual capital for competitive advantage.

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